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ABSTRACT

A mandatory developmental education program at Vincennes University Junior College (Indiana) was evaluated, based on Roueche's standards for successful developmental programs. The college tests all incoming students whose scores on the American College Testing Program/Scholastic Aptitude Test suggest the need for remediation. Students who need remediation are placed in developmental reading, writing, and mathematics courses, as required. Additional options include study skills, speech, and spelling courses. Evaluation findings include: placement tests given during freshman orientation indicated that about one-fourth of the fall 1984 students required developmental courses; those who tested out of developmental courses exhibited significantly higher persistence and graduation rates than either the large developmental population or the entire class; women completed more hours and had higher first and second semester grade point averages, and the retention rate of developmental students (to fourth semester) was about 52%. A statement of the college's developmental placement policy is appended, along with information on the statistical programs that were used to evaluate students. (SW)

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An Evaluation of a Junior College Developmental Education Program

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HE 020 244

for Management Research, Policy Analysis, and Planning

This paper was presented at the Twenty-Sixth Annual Forum of the Association for Institutional Research held at the Marriott Orlando World Center, Orlando, Florida, June 22-25, 1986. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum Papers.

Ann K. Dickey, Chair
Forum Publications Editorial
Advisory Committee

An Evaluation of a Junior College Developmental Education Program

Abstract: SAS routines were used to capture and link four semesters of data from the student information system. Medium and short-range measures were used to evaluate a mandatory developmental education program at a comprehensive community college. Various factors of the local program were assessed against Roueche's "successful program" standards.

In an age of shrinking budgets and growing demands for accountability, the evaluation of academic programs hardly requires justification. However, the need for evaluation is particularly acute in college remedial programs. Such programs are apt to be large and expensive. Programs that obtain funds from government or foundation grants may be required to submit evaluations. Often the programs employ innovative teaching strategies which invite comparison with more traditional instruction. And perhaps most important, the viability of the entire curriculum may be determined by the effectiveness of the remedial program: only if the student body is properly prepared in basic skills can standards be maintained in later courses.

Review of the Literature

Despite these factors, there is presently no generally accepted model for evaluating remedial education. An ERIC search of the keywords reveals that available research tends to focus on placement validity (Weber, 1985; Rounds and Andersen, 1985; Johnson, 1984); and alternative teaching methods, particularly within a given discipline (Palmer, 1984). There are also studies on

class size, correlations between reading and mathematical achievement, and attempts to assess individual developmental programs, similar to this paper.

Akst and Hecht (1980) have written the most comprehensive guide for designing an evaluation of the developmental education program. All evaluation attempts must contain pre-program and post-program measures, a grouping statistic, and some form of control group. Akst and Hecht recommend that the pretest measures may be aptitude or achievement test scores. Post-program measures should be both short-range (final grade or final examination scores) and long-range (grade in the next course); GPA after a specified number of semesters; credits earned; persistence in college). Tests administered after the student leaves the remedial program, or measures involving follow-up study after college are seldom practical.

The most straightforward evaluation design is the single-group pretest/post comparison. It is concerned with only the remedial population, and uses as pre-program and post-program measures two equivalent forms of the same test. Wolf (1979) strongly cautions against this design, recommending that it be used only if the available alternative, NO evaluation, is unacceptable and if all the evaluative biases are controlled for.

It is generally considered unethical to withhold remedial opportunities from those who need it. A strategy which circumvents the ethical question is to use as control those students whose pre-program measures indicate the need for remedial work but who nonetheless manage to evade it.

Akst and Hecht (1980) discuss four evaluative designs:

(1) the **remediated-exempted comparison**, in which the performance of the exempted population is used as the standard for assessing the achievement of remediated students;

(2) **norm-group comparison**, where the standard is the performance of a national population;

(3) the **cross-group comparison**, comparing the effectiveness of two different remedial programs, usually at separate institutions; and

(4) **historical comparison**, which contrasts the effectiveness of a current program with that of one previously offered at the same school.

Dumont's paper at the 1981 Forum was an example of a comprehensive application of the Ankst and Hecht design.

Since at least 1968, John Roueche have been refining methodology to evaluate developmental programs. Studies of postsecondary institutions during the 60's and 70's (Roeuche, 1968) documented that community colleges bore the brunt of great influxes of underprepared students. Studies of program effectiveness did produce some examples of successful developmental efforts (Roueche and Kirk, 1973). A national study in 1977 (Roueche and Snow) documented that the need for developmental services had moved into the 4-year institutions.

In 1983 Roueche conducted a national study to investigate the status of developmental education at all colleges and universities in the United States (Roueche and Baker, 1984). A useable response rate of 58% (N=1,452) permitted the identification of some eleven elements of "successful" developmental programs: (1) strong administrative support; (2) mandatory assessment and placement; (3) structured courses; (4) award credit; (5) flexible completion strategies; (6) multiple learning systems: (7) instructors who volunteer for this teaching assignment; (8) peer tutors; (9) monitor student behavior; (10) interface basic skills courses with regular, subsequent courses; and (11) conduct evaluations of their effectiveness.

The study also found, however, that in the majority of these programs students are required to more reading, writing, and figuring in basic skills courses than in regular courses; half the students in many classes do not purchase text books; basic skills courses are only loosely related to other courses in the college; exams in non-developmental courses are typically objective (short-answer, true-false, or multiple choice); and evaluation of developmental courses is entirely inadequate.

Research Design

Vincennes University is the only community college in the state and serves the entire state. Approximately one-fourth of the students require some kind of remedial help in order to successfully accomplish college-level work. The university employs a policy of mandatory placement testing of all incoming students whose ACT or SAT scores (or lack thereof) suggest the need for remediation, and mandatory placement in developmental reading, writing, and mathematics courses as required. Additional options (study skills, speech, and spelling credit courses; the "Developmental Semester"; and reading paired courses) are additional recommended supports. The student is free to move into a lower level, without penalty, throughout the first half of the semester, or to complete the coursework early. The current placement policy is attached as Appendix One.

The purpose of this study was to prepare and present meaningful, objective information which would assist the institution in improving its programs and services for under-prepared students, and for consensus-building among the academic administrators to support a strong developmental program.

Methodology

Descriptors of the fall 1984 first-time full-time freshmen were extracted from the student information system and read into a permanent SAS file: name, ID, sex, race, SAT-verbal, SAT-math, DTLS, DTMS, initial major, semester GPA, and withdrawal date. Additional files were created for the second, third, and fourth semesters containing ID, withdrawal date, graduation date, major, and semester GPA for each semester. A new SAS file was created by merging by ID these four files. The SAS programs are given as Appendix Two.

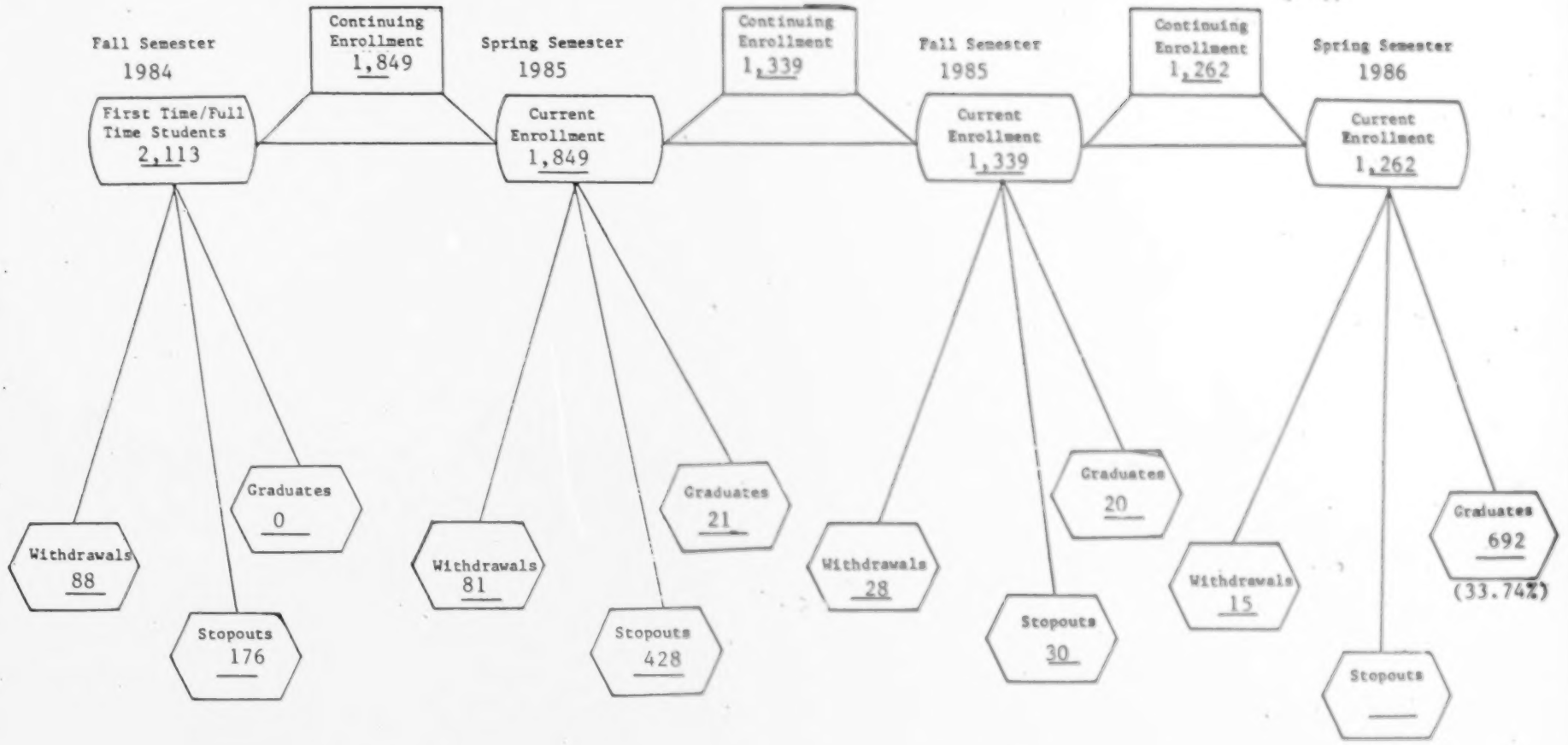
A retention trace (flow through majors) was prepared for each academic discipline and discussed with each division chair to attain confidence in the data. University-wide (Population "A") persistence and graduation rates became the baseline data to which sub-populations were compared.

SAS subsets were created based on various SAT-Verbal and SAT-Mathematics characteristics: No available test scores (Population "B"); those who "tested out" of developmental courses by virtue of placement scores higher than the established cut-off scores (Population "C"); those with skills deficiency in either verbal OR mathematics skills (i.e., the "largest" developmental population, Population "D"); those deficient in verbal skills only (Population "E"); those with a severe deficiency in mathematics skills (SAT-Math $\leq$ 280 and DTMS $<$ 8, Population "F"); those with marginal mathematics skills (SAT-M $\leq$ 280 and DTMS between 8 and 15 - Population "G"); and those severely deficient in both mathematics and verbal skills (Population "H").

Extensive analyses were conducted on Population D, the largest developmental population. SAS frequency tables and Chi-Square analysis of persistence

POPULATION Fall 1984 First Time Full Time Freshmen

Figure 1 **A**



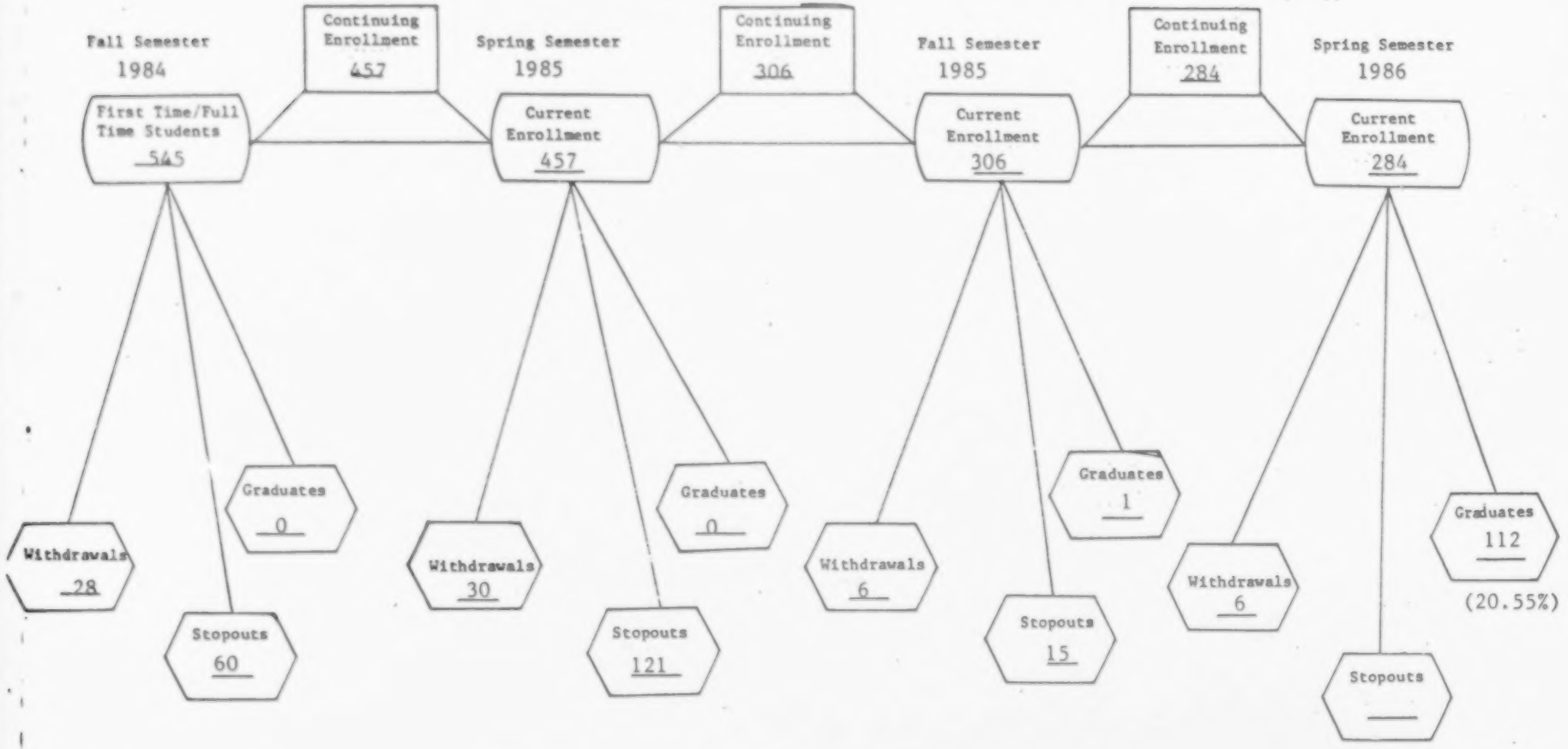
RETENTION:	NA	NA	NA
NORM:	87.50	63.36	59.72

POPULATION First Time Full Time Students 1984 - Developmental Population

(SAT_V < 290 and DTLS < 24) OR (SAT_M < 290 and DTMS < 16)

Figure II

D

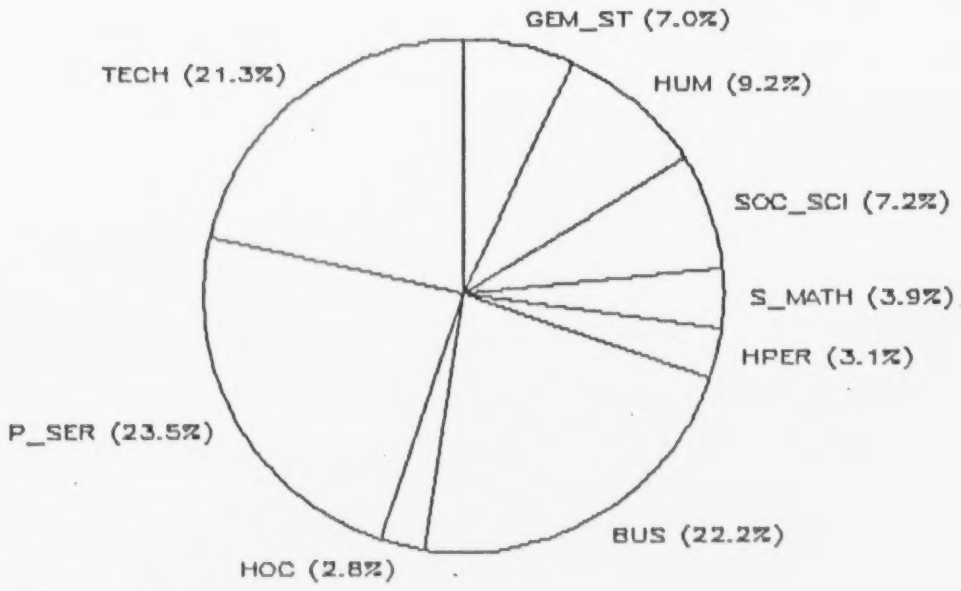


RETENTION:	83.85%	56.15%	52.11%
Entire Class	87.50%	63.36%	59.72%

Figure III

FTFT1984 DEVELOPMENTAL STUDENTS

(SAT_V <290 and READ <24) or (SAT_M <290 and MATH <16)



	Number	Stayed Four Semesters
General Studies	38	17
Humanities	50	24
Social Sciences	39	17
Science and Math	21	10
HPER	17	7
Total Academic	165	75
Business	121	63
Health Occupations	15	9
Public Services	128	72
Technology	116	69
Total Occupational	380	213
Total University	545	288

Office of Research and Planning
June 1986

SOURCE: Student Master File 1984-85, 1985-86

by sex, by race, and by division were conducted. Success as measured by persistence and grade point average each semester were submitted to analysis of variance by sex, race, division, with Schiffe and Tukey followup.

SAS bar charts were used to show semester grade point distributions. A Lotus pie graph showed the divisions in which the Developmental students majored; bar graphs showed those divisions in which they were persisting.

Individual booklets were prepared for each division, giving a name-related trace of all of the 1984 first-time full time students and those included in the "developmental" population who were majoring in this division. The study results and graphs were presented and discussed at an end of the school year retreat for senior administrators and academic deans.

Findings

1. Placement tests given during freshman orientation indicated that approximately one-fourth of the fall 1984 students (25.79%) required developmental courses. The majors these students select is not significantly different from the pattern of choice by the entire class (Figure I).

2. Those who tested out of developmental courses by virtue of DTLS or DTMS scores (which overrode SAT scores) exhibited significantly higher persistence and graduation rates than either the "large" developmental population or the entire class. This is taken as evidence that the placement testing system is valid.

3. Major curriculum (Division) is not a statistically significant success factor.

4. While division was not a statistically significant variable in "success", sex was. Women completed more hours, and had higher first and second semester grade point averages.

5. Retention rate of developmental students (to fourth semester) is approximately 52%; there is no statistically significant difference among divisions. There is, however, considerable variation among academic programs ranging from 100% (Aviation Maintenance) to less than one third (Commercial Art and Design).

Discussion

Not everything went well with this project. In a mandatory program there is no non-remediated group which can serve as control. This greatly compounds the difficulty in evaluation design.

Many attempts were made to partition the developmental population into sub-populations. The Speech and Study Skills faculty, for example, wanted to assess the impact of their courses. Thus groupings became those who had taken only what was required, what was required plus ... This resulted in very many cells (N=12), some with very small count.

In another design, the developmental population was partitioned into fully remediated, partially remediated (i.e., took PART of the required) courses), and essentially non-remediated (did not complete ANY of the developmental work). This design had a wide range of variability in the "partially remediated" category. Although discussed in positive terms by Roueche and Baker, this model did not receive administrative support so was not pursued.

A most important data element must be added in future studies, and this is the success (grade) in subsequent related courses. It is seldom practical to follow a student after he or she has left the institution.

It is generally accepted that developmental students, upon enrollment, are placed within a narrow range of entry-level basic skills competency, and are advanced toward "college-level skills" while they are in the developmental course(s). If it were possible to obtain a standardized assessment of basic skills upon exit, then a simple correlation assessment should provide an indi-

cator of program success. Standardized exit levels in verbal or mathematical skills were not available. A surrogate reading exit scale has been developed and will be the topic of a subsequent study.

There are other less quantitative but equally important findings. By small group discussion, consensus was reached that Vincennes University has a "good" developmental program. Weighed against Roeuche's eleven elements of "successful" programs, all are in place. This is not to say that there cannot be improvement, especially in the areas of communications and evaluation.

Vincennes University's program, likewise, has many of the less favorable characteristics of most programs: relatively little articulation between developmental and "regular" faculty and courses; too many objective tests; too little opportunity to further develop and practice basic skills.

This was the first time meaningful, name-related information by curriculum was made available to those who must make the decisions and defend the program. The deans and division chairmen expressed their appreciation for this information specific to their departments.

Implications for the Institutional Researcher

"Everyone knows how simple it is to design an evaluation." Is it? The remedial/developmental program may be one of the most highly controversial -- and political -- issues on campus. The opportunity to explore the issues and to review available evaluation designs and their practical application may be one of the most significant experiences offered at the 1986 AIR Forum.

It is important for the Institutional Researcher to remember who her audience is. While it is great fun to design a complex research study with highly sophisticated statistical algorithms, she then must spend a great deal of time explaining and defending the numbers. Academic administrators, faced with many pressing issues, look to us for "bottom line" insights upon which to make the best decisions. It is our continuing challenge to constantly upgrade the level of understanding about statistics, but to keep it below the level of toxicity.

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Appendix One

POLICY - Developmental Placement 1986-87 VINCENNES UNIVERSITY

TO: All Faculty
FROM: Dean John P. Schmeling
SUBJECT: Developmental Placement
DATE: April 29, 1986

Listed below are the criteria for math, reading and english placement. University policy indicates that all developmental placements are to be observed by advisors in the student's first semester. It is important to remember that students are tested again in class to verify placement. Students are moved if their test scores show they should be in a higher level class.

In addition to these mandatory placements, you might want to encourage students with SAT verbal or math scores of 280 or less to enroll in Survival Skills (HES 009) and Fundamentals of Speech (HSS 009). These classes are particularly important if both verbal and math scores are below 280. Students with an SAT verbal score of 280 or less should not be placed in Study Skills (HES 100) their first semester.

ENGLISH AND READING

In English and Reading placement is based on the higher the DTLS score, SAT verbal score or the ACT score. Therefore, if a student has a verbal SAT score of 280 or less, but scores 24 or higher on the DTLS, the student would be placed in Comp. I and Reading Tech.

ACT Score	SAT Score	DTLS Score	English Placement	Reading Placement
10 or less	280 or less	23 or less	HEW 009	HER 009
11-13	290 through 330	24 through 35	HEW 101	HER 011
14 or higher	340 or higher		HEW 101	

MATH

Math placement is based on the SAT math score. (or ACT Score),. and either the DTMS score or the arithmetic score. SMA 009 and 011 Placement is based on SAT (ACT) and arithmetic scores, whichever is higher. SMA 012 and 102 placement is based on SAT (ACT) and DTMS scores, whichever is higher.

ALL STUDENTS

ACT Score	SAT Math Score	DTMS Score	Arithmetic Score	Math Class
5 or less	280 or less		15 or less	SMA 009

ALGEBRA SEQUENCE

ACT Score	SAT Math Score	DTMS Score	Arithmetic Score	Math Class
5 or less	280 or less		15 or less	SMA 009
6-10	290-340		16-20	SMA 011
11-17	350-440	11-28		SMA 012
18-24	450-540	29-35		SMA 102

MATH FOR MAJOR SEQUENCE

ACT Score	SAT Math Score	DTMS Score	Arithmetic Score	Math Class
5 or less	280 or less		15 or less	SMA 009
6 or higher	290 or higher	8 or higher	16 or higher	Math for major SMT 103 or SMT 105 or SMT 109 or SMA 100

Appendix Two

DOCUMENTATION:
INSTITUTIONAL RESEARCH

Retention Studies - Vincennes University

Introduction

Retention studies are a significant aspect of institutional research at Vincennes University. These may be studies of students who applied but did not enroll ("No-Show"), students who dropped out during the semester ("Withdrawals"), or students who did not graduate but failed to return a subsequent semester ("Stopouts"). They may be for a total population or for a subpopulation (developmental students, minorities, ...)

Studies of "No-Shows"

The names and descriptors of "No-Shows" can be requested from the Management Information Center as soon as the Fall Master File is ready. The Admissions Director now conducts an annual telephone survey of No-Shows.

It is suggested that the proposed MAJORS of no-shows be added this year (Fall 1986). This will permit an assessment of SHOW RATE to be used in conjunction with the annual pre-admission summary status reports now used each spring.

Retention Trace

A name-related trace was formerly done by program IR0009, but is no longer available on the new Student Information System. The same product can be prepared quite easily by SAS, however. SAS offers the added flexibility of extraction of desired subpopulations.

Creating a Permanent SAS File

1. Ask the Management Information Center to create a tape of the desired population(for example, all First Time Full Time Students, Main Campus, desired semester). Ask for a Tape Layout and select data elements you wish to retain.

2. Load tape to your ID:

```
CMS FILEDEF RGTO2IP TAPL (LRECL 550 BLKSIZE 550 RECFM FB;
DATA DATA.FTFT841;
   INFILE RGTO2IP;
INPUT
       ID   $       1-9
       SEX           91        ;
RUN;
```

3. Load subsequent semesters data on the cohort population in a similar manner.

4. Merge all semesters by ID;

```
data ftft841; set data.ftft841; proc sort; by id; run;
data ftft842; set data.ftft842; proc sort; by id; run;
data ftft843; set data.ftft843; proc sort; by id; run;
data ftft844; set data.ftft844; proc sort; by id; run;
DATA FTFT84; MERGE FTDFT841 FTFT842 FTFT843 FTFT844; BY ID; RUN;
Proc sort; by name; run;
```

5. Sort as desired; print as desired. (entire population)

6. Establish desired sub-populations:

```
DATA LARGE; set ftft84; if (sat_v   290 and read  25) or (sat_m   290
  and math   25);
Title '1984 FTFT DEVELOPMENTAL POPULATION - THE LARGEST POPULATION';
```

Sort, analyze, and print as desired.